

REMARKS

Claims 1-20 were pending in the above-identified application when last examined and are amended as indicated above. No amendments are made.

Claims 1, 3, 6, 8, 9, 11, 14-17, and 19 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. patent No. 4,926,242 (Itoh). Applicants respectfully traverse the rejection.

Independent claim 1 distinguishes over Itoh at least by reciting, "a heat slug bonded to a backside of the semiconductor chip; and a solder film that bonds the heat slug to the backside of the semiconductor chip."

Q Itoh describes "a heat radiation structure that is excellent in heat conductivity." See col. 2, lines 26-27. Fig. 5 and col. 6, lines 55-66 of Itoh shows that semiconductor chip 54 is attached to envelope 52₁ through Mo plate 55 and solder layer 56 and that heat sink 51 is attached to envelope 52₁. Itoh discloses a heat sink attached not to a semiconductor chip, but to another structure (an envelope). In the Response to Arguments portion of the September 12, 2001 Office Action, the Examiner noted that the claim 1 "does not require heat slug to be attached or contacted directly to the semiconductor chip." The Examiner further noted that the claim 1 "does not exclude that other structures to be formed between the heat slug and the semiconductor chip." Claim 1 of the pending application recites "a solder film that bonds the heat slug to the backside of the semiconductor chip." (Emphasis added.) In order to bond the heat slug to the semiconductor chip, the solder film must be in a direct contact with the heat slug. That is, the bonding recited in claim 1 does not simply mean that the solder film is between the heat slug and the semiconductor chip, but that the solder film is in a direct contact with the heat slug and the semiconductor chip. Accordingly, since Itoh fails to teach or suggest "a heat slug bonded to a backside of the semiconductor chip; and a solder film that bonds the heat slug to the backside of the semiconductor chip", claim 1 is patentable over Itoh.

Claims 3, 6, 8, 9, and 11 are patentable over Itoh for at least the reason of dependency on claim 1, which is patentable over Itoh.

Independent claim 14 distinguishes over Itoh at least by reciting, "bonding a heat slug on a backside of the semiconductor chip using a solder film."

LAW OFFICES OF
SKJERVEN MORRILL
MACPHERSON LLP

25 METRO DRIVE
SUITE 700
SAN JOSE, CA 95110
(408) 453-9200
FAX (408) 453-7979

Claim 14 is patentable over Itoh at least on the same ground that claim 1 is patentable over Itoh. Claim 15 is patentable over Itoh for at least the reason of dependency on claim 14.

Independent claim 16 distinguishes over Itoh at least by reciting, "a heat slug bonded to the semiconductor chip ... ; and a solder film that bonds the heat slug to the backside of the semiconductor chip."

Claim 16 is patentable over Itoh at least on the same ground that claim 1 is patentable over Itoh. Claims 17 and 19 are patentable over Itoh for at least the reason of dependency on claim 16.

For the above reasons, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 102.

Claims 2 and 13 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. patent No. 4,926,242 (Itoh) in view of U.S. patent No. 5,359,768 (Haley). Applicants respectfully traverse the rejection.

Claim 4 was rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. patent No. 4,926,242 (Itoh) in view of U.S. patent No. 5,683,937 (Furukawa). Applicants respectfully traverse the rejection.

Claim 5 was rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. patent No. 4,926,242 (Itoh) in view of U.S. patent No. 5,811,317 (Maheshwari). Applicants respectfully traverse the rejection.

Claims 7 and 18 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. patent No. 4,926,242 (Itoh) in view of U.S. patent No. 5,336,364 (Takahama). Applicants respectfully traverse the rejection.

Claims 10 and 20 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. patent No. 4,926,242 (Itoh) in view of U.S. patent No. 6,060,778 (Jeong). Applicants respectfully traverse the rejection.

Claim 12 was rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. patent No. 4,926,242 (Itoh). Applicants respectfully traverse the rejection.

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MACPHERSON LLP

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SUITE 700
SAN JOSE, CA 95110
(408) 453-9200
FAX (408) 453-7979

As discussed above Itoh fails to teach or suggest the features recited in independent claims 1, 14, and 16. Haley, Furukawa, Maheshwari, Takahama, and Jeong also fail to teach or suggest the features recited in claims 1, 14, and 16. Accordingly, claims 1, 14, and 16 are patentable over Itoh, Haley, Furukawa, Maheshwari, Takahama, and Jeong, and claims 2, 4, 5, 7, 10, 12, 13, 18, and 20 are patentable over Itoh, Haley, Furukawa, Maheshwari, Takahama, and Jeong, respectively, for at least the reason of dependency on claims 1, 14, and 16, which are patentable.

In rejecting claims 10 and 20, the Examiner indicated that Jeong disclosed the anodizing layer recited in claims 10 and 20. Fig. 6 and col. 8, lines 3-5 of Jeong discloses anodizing layer 73a on the surface of second thermal conductive layer 73, on which integrated circuit chip 40 is bonded. Accordingly, Jeong fails to teach or suggest the anodizing layer recited in claims 10 and 20, which is "an anodizing layer on a surface of the heat slug that is opposite to another surface of the heat slug, on which the semiconductor chip is bonded."

For the above reasons, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103.

In summary, claims 1-20 were pending in the application. No amendments are made. For the above reasons, Applicants respectfully request allowance of claims 1-20. Should the Examiner have any questions concerning this response, the Examiner is invited to call the undersigned at (408) 453-9200.

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Respectfully submitted,



David W. Heid
Attorney for Applicant(s)
Reg. No. 25,875

LAW OFFICES OF
SKJERVEN MORRILL
MACPHERSON LLP

25 METRO DRIVE
SUITE 700
SAN JOSE, CA 95110
(408) 453-9200
FAX (408) 453-7979